

# Shigellosis

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Shigellosis refers to disease caused by any bacteria in the genus *Shigella*. There are four *Shigella* species: *S. dysenteriae*, *S. flexneri*, *S. boydii*, and *S. sonnei*.

### B. Clinical Description

The most common symptoms of shigellosis are diarrhea (sometimes bloody), fever, nausea, vomiting and stomach cramps. Dehydration may be severe, especially among infants and the elderly. Asymptomatic infections also occur. The disease is usually self-limiting, lasting 4–7 days. The severity of the illness and the case-fatality rate are usually a function of the host and species, with the very young and the elderly experiencing the most severe illness. *S. dysenteriae* is usually associated with more severe disease and complications.

### C. Reservoirs

Humans are the only significant reservoir.

### D. Modes of Transmission

*Shigella* is transmitted via the fecal-oral route. The most common mode of transmission is person-to-person spread of the bacteria from a case or carrier. A very small dose of *Shigella* is needed to cause illness (probably 10–100 organisms). Individuals shedding the bacteria may also contaminate food by failing to properly wash their hands before foodhandling activities, potentially causing large numbers of people to become ill. Person-to-person spread typically occurs among household contacts, preschool children in daycare, and the elderly and developmentally disabled living in residential facilities. Transmission can also occur person-to-person through certain types of sexual contact (*e.g.*, oral-anal contact). Flies can potentially spread the bacteria by landing on contaminated feces and then on food.

### E. Incubation Period

The incubation period can vary from 12 to 96 hours, but is usually about 1–3 days. It can be up to a week for *S. dysenteriae*.

### F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Shigella* in their stool. This usually lasts for about 4 weeks from onset of illness. Effective antibiotic treatment has been shown to decrease the shedding period to a few days.

### G. Epidemiology

Shigellosis has a worldwide distribution, with approximately 600,000 deaths reported annually throughout the world. Most of these deaths occur in children. Secondary attack rates can be as high as 40% in households. Approximately 300 cases are reported in Massachusetts annually. Outbreaks occur in daycare centers, among men who have sex with men, and in jails. In the summer of 1991, over 1000 cases of shigellosis occurred in western Massachusetts, mostly spread person-to-person among young children. Outbreaks have also been caused by contaminated imported food. *S. sonnei* is the most common *Shigella* species reported in Massachusetts.

## 2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

### A. What to Report to the Massachusetts Department of Public Health

- Isolation of *Shigella* species from any clinical specimen.

*Note:* See Section 3) C below for information on how to report a case.

### B. Laboratory Testing Services Available

The Massachusetts State Laboratory Institute (SLI), Enterics Laboratory will test stool specimens for the presence of *Shigella* and will confirm and speciate isolates of *Shigella* obtained from clinical specimens at other laboratories. Additionally, the Enteric Laboratory requests that all laboratories submit *all* isolates cultured for further identification to aid in the public health surveillance necessary for this illness. For more information call the Enterics Laboratory at (617) 983-6609.

The SLI, Food Microbiology Laboratory (617- 983-6616) will test implicated food items from a cluster or outbreak. See Section 4) D, Environmental Measures, for more information.

## 3) DISEASE REPORTING AND CASE INVESTIGATION

### A. Purpose of Surveillance and Reporting

- To identify whether the case may be a source of infection for other persons (*e.g.*, a diapered child, daycare attendee or foodhandler) and, if so, to prevent further transmission.
- To identify transmission sources of public health concern (*e.g.*, a restaurant or a commercially distributed food product) and to stop transmission from such sources.

### B. Laboratory and Healthcare Provider Reporting Requirements

Refer to the lists of reportable diseases (at the end of this manual's Introduction) for information.

### C. Local Board of Health Reporting and Follow-Up Responsibilities

#### 1. Reporting Requirements

Massachusetts Department of Public Health (MDPH) regulations (*105 CMR 300.000*) stipulate that each local board of health (LBOH) must report the occurrence of any case of shigellosis, as defined by the reporting criteria in Section 2) A above. Current requirements are that cases be reported to the MDPH Division of Epidemiology and Immunization, Surveillance Program using an official MDPH *Bacterial and Parasitic Gastroenteritis Case Report Form* (in Appendix A). Refer to the *Local Board of Health Reporting Timeline* (at the end of this manual's introductory section) for information on prioritization and timeliness requirements of reporting and case investigation.

#### 2. Case Investigation

- a. It is the LBOH responsibility to complete a *Bacterial and Parasitic Gastroenteritis Case Report Form* (in Appendix A) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the case's healthcare provider or the medical record.
- b. Use the following guidelines to assist you in completing the form:
  - 1) Accurately record the demographic information, date of symptom onset, symptoms, and medical information.
  - 2) When asking about exposure history (food, travel, activities, etc.), use the incubation period for shigellosis (12–96 hours). Specifically, focus on the period beginning a minimum of 12 hours prior to the case's onset back to no more than 96 hours before onset.

- 3) If possible, record any restaurants at which the case ate, including food item(s) and date consumed. If you suspect that the case became infected through food, use of the MDPH *Foodborne Illness Complaint Worksheet* (Appendix A) will facilitate recording additional information. It is requested that LBOHs fax or mail this worksheet to the MDPH Division of Food and Drugs (see top of worksheet for fax number and address). This information is entered into a database to help link other complaints from neighboring towns, thus helping to identify foodborne illness outbreaks. *This worksheet does not replace the Bacterial and Parasitic Gastroenteritis Case Report Form.*
  - 4) Ask questions about travel history and outdoor activities to help identify where the case became infected.
  - 5) Ask questions about water supply because shigellosis may be acquired through water consumption.
  - 6) Household/close contact, pet or other animal contact, daycare, and foodhandler questions are designed to examine the case's risk of having acquired the illness from, or potential for transmitting it to, these contacts. Determine whether the case attends or works at a daycare facility and/or is a foodhandler.
  - 7) If you have made several attempts to obtain case information, but have been unsuccessful (*e.g.*, the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason why it could not be filled out completely.
- c. After completing the case report form, attach lab report(s) and mail (in an envelope marked "Confidential") to the MDPH Division of Epidemiology and Immunization, Surveillance Program. The mailing address is:
- MDPH, Division of Epidemiology and Immunization  
Surveillance Program, Room 241  
305 South Street  
Jamaica Plain, MA 02130
- d. Institution of disease control measures is an integral part of case investigation. It is the LBOH responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4), Controlling Further Spread.

## 4) CONTROLLING FURTHER SPREAD

### A. Isolation and Quarantine Requirements (105 CMR 300.200)

Foodhandlers with shigellosis must be excluded from work. *Note:* A case of shigellosis is defined by the reporting criteria in Section 2) A of this chapter.

#### Minimum Period of Isolation of Patient

After diarrhea has resolved, foodhandlers may return to work after producing one negative stool specimen. If a case has been treated with an antimicrobial, the stool specimen shall not be submitted until at least 48 hours after cessation of therapy. In outbreak circumstances, a second consecutive negative stool specimen will be required prior to returning to work.

#### Minimum Period of Quarantine of Contacts

Contacts with diarrhea who are foodhandlers shall be considered the same as a case and handled in the same fashion. No restrictions otherwise.

*Note:* A foodhandler is any person directly preparing or handling food. This can include a patient care or child care provider. See glossary for a more complete definition.

### B. Protection of Contacts of a Case

None.

## C. Managing Special Situations

### Daycare

Since shigellosis may be transmitted person-to-person through fecal-oral transmission, it is important to follow up on cases of shigellosis in a daycare setting carefully. The MDPH *Health and Safety in Child Care* provides detailed information on case follow-up and control in a daycare setting. General recommendations include:

- Children with *Shigella* infection who have diarrhea should be excluded until their diarrhea is gone.
- Children with *Shigella* infection who have no diarrhea and are not otherwise ill may be excluded or may remain in the program if special precautions are taken.
- Since most staff in child care programs are considered foodhandlers, those with *Shigella* in their stools (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea is gone and they have one negative stool test (submitted at least 48 hours after completion of antibiotic therapy, if antibiotics are given). (Per 105 CMR 300.200)
- Refer to Chapter 17 of the MDPH *Health and Safety in Child Care* for complete guidelines on handling diseases spread through the intestinal tract.

### School

Since shigellosis may be transmitted person-to-person through fecal-oral transmission, it is important to carefully follow up on cases of shigellosis in a school setting. The MDPH *Comprehensive School Health Manual* provides detailed information on case follow-up and control in a school setting. General recommendations include:

- Students or staff with *Shigella* infection who have diarrhea should be excluded until their diarrhea is gone.
- Students or staff with *Shigella* who do not handle food, have no diarrhea or mild diarrhea, and are not otherwise sick may remain in school if special precautions are taken.
- Students or staff who handle food and have *Shigella* infection (symptomatic or not) must not prepare food until their diarrhea is gone and they have one negative stool test (submitted at least 48 hours after completion of antibiotic therapy, if antibiotics are given). (Per 105 CMR 300.200)
- Refer to Chapter 8 of the MDPH *Comprehensive School Health Manual* for complete guidelines on handling diseases spread through the intestinal tract.

### Community Residential Programs

Actions taken in response to a case of shigellosis in a community residential program will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with shigellosis should be placed on standard (including enteric) precautions until their symptoms subside *and* they test negative for *Shigella*. (Refer to the Division of Epidemiology and Immunization's *Control Guidelines for Long-Term Care Facilities* for further actions. A copy can be obtained by calling the Division at 617-983-6800 or 888-658-2850.) Staff members who give direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered foodhandlers and are subject to foodhandler restrictions under 105 CMR 300.200. (See Section 4A above.) In addition, staff members with *Shigella* infection who are not foodhandlers should not work until their diarrhea is gone.

In residential facilities for the developmentally disabled, staff and clients with shigellosis must refrain from handling or preparing food for other residents until their symptoms have subsided and they test negative for *Shigella* (submitted at least 48 hours after completion of antibiotic therapy, if antibiotics are given). In addition, staff members with *Shigella* infection who are not foodhandlers should not work until their diarrhea is gone.

**Reported Incidence Is Higher than Usual/Outbreak Suspected**

If the number of reported cases of shigellosis in your city/town is higher than usual, or if you suspect an outbreak, investigate to determine source of infection and mode of transmission. A common vehicle (such as water, food or association with a daycare center) should be sought and applicable preventive or control measures should be instituted. Control of person-to-person transmission requires special emphasis on personal cleanliness and sanitary disposal of feces. Consult with the epidemiologist on-call at the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several town lines and therefore be difficult to identify at a local level.

*Note:* Refer to the MDPH *Foodborne Illness Investigation and Control Reference Manual* for comprehensive information on investigating foodborne illness complaints and outbreaks. (Copies of this manual were distributed to local boards of health in 1997–98. It can also be located on the MDPH website in PDF format at <<http://www.magnet.state.ma.us/dph/fpp/refman.htm>>.) For recent changes (fall of 2000) to the Massachusetts Food Code, contact the Division of Food and Drugs, Food Protection Program at (617) 983-6712 or through the MDPH website at <<http://www.state.ma.us/dph/fpp/>>.

**D. Preventive Measures****Environmental Measures**

Implicated food items must be removed from the environment. A decision about testing implicated food items can be made in consultation with the Division of Food and Drugs (DFD) or the Division of Epidemiology and Immunization. DFD can help coordinate pickup and testing of food samples. If a commercial product is suspected, DFD will coordinate follow-up with relevant outside agencies.

*Note:* The role of the DFD is to provide policy and technical assistance with the environmental investigation such as interpreting the Massachusetts Food Code, conducting a HACCP risk assessment, initiating enforcement actions and collecting food samples.

The general policy of the SLI is only to test food samples implicated in suspected outbreaks, not single cases (except when botulism is suspected). The LBOH may suggest that the holders of food implicated in single case incidents locate a private laboratory that will test food or store the food in their freezer for a period of time in case additional reports are received. However, a single, confirmed case with leftover food consumed within the incubation period may be considered for testing.

*Note:* Refer to the MDPH *Foodborne Illness Investigation and Control Reference Manual* for comprehensive information on investigating foodborne illness complaints and outbreaks.

**Personal Preventive Measures/Education**

To avoid future exposures, recommend that individuals:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- After changing diapers, wash the child's hands as well as their own.
- In a daycare setting, dispose of feces in a sanitary manner.
- When caring for someone with diarrhea, scrub their hands with plenty of soap and water after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes or soiled sheets.

- Avoid sexual practices that may permit fecal-oral transmission. Latex barrier protection should be emphasized as a way to prevent the spread of shigellosis to sexual partners as well as being a way to prevent the exposure to and transmission of other pathogens.
- Keep flies from contaminating food.

A *Shigella Public Health Fact Sheet* can be obtained from the Division of Epidemiology and Immunization or through the MDPH website at <<http://www.state.ma.us/dph/>>. Click on the “Publications” link and scroll down to the Fact Sheets section. It is also available in Spanish.

### International Travel

The following recommendations can be helpful to travelers to developing countries.

- “Boil it, cook it, peel it, or forget it.”
- Drink only bottled or boiled water, keeping in mind that bottled carbonated water is safer than uncarbonated water.
- Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well.
- Peel your own raw fruits or vegetables and do not eat the peelings.
- Avoid foods and beverages from street vendors.

*Note:* For more information regarding international travel contact the Center for Disease Control and Prevention (CDC), Traveler’s Health Office at (877) 394-8747 or through the internet at <<http://www.cdc.gov/travel>>.

## ADDITIONAL INFORMATION

The formal Centers for Disease Control and Prevention (CDC) surveillance case definition for shigellosis is the same as the criteria outlined in Section 2) A of this chapter. (CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting.) For reporting to the MDPH, always refer to Section 2) A.

## REFERENCES

American Academy of Pediatrics. *1997 Red Book: Report of the Committee on Infectious Diseases, 24<sup>th</sup> Edition*. Illinois, Academy of Pediatrics, 1997.

CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR*. 1997; 46:RR-10.

CDC Website. Shigellosis: Frequently Asked Questions. Available at <[http://www.cdc.gov/ncidod/dbmd/diseaseinfo/shigellosis\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/shigellosis_g.htm)>. Updated September 2, 1999.

Chin, J., ed. *Control of Communicable Diseases Manual, 17<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2000.

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